

Appln. No. 10/009,504

Attorney Docket No. 10541-824

II. Remarks

Claims 1-13 and 15-24 stand rejected. Claims 1, 6, and 12 are being amended and claims 13 and 15-24 are being cancelled. Accordingly, after entering this amendment, claims 1-12 remain pending.

Reconsideration and re-examination of this application in view of the above amendments and the following remarks are respectfully requested.

Claim Rejections – 35 U.S.C. § 112

Claims 1-13 and 15-24 have been rejected under 35 U.S.C. § 112, second paragraph as being indefinite. In response, the claims have been amended to more specifically define the invention. The invention is directed to a heat exchanger for a motor vehicle radiator that conveys commonly known radiator coolants to exchange heat. These radiator coolants have known densities that flow through the radiators at known velocities at typical operating temperatures of motor vehicles. Specifically, the heat exchanger includes one or more tubes with opposing walls with internal projections. The projections are arranged in groups, and, within each group, the projections are arranged along a line. The line of projections on one opposing wall extend in a different direction than the line of projections on the other opposing wall.

Accordingly, it is believed that this rejection is now moot and should be withdrawn.

Claim Rejections – 35 U.S.C. § 102 and 103

Claims 1-5, 9, 12, 13, 15-17, 21, and 24 have been rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as

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being obvious over U.S. Patent No. 5,703,213 to Kiser ("Kiser"). Claims 6-8, 10, 11, 18-20, 22, and 23 have been rejected under 35 U.S.C. §103(a) as being obvious over the combined teachings of Kiser and U.S. Patent No. 4,470,452 to Rhodes ("Rhodes").

Kiser discusses a flattened cooling tube for heat exchangers. The tube (24) has internal opposing walls provided with respective downwardly and upwardly projecting sets of dimples (34). Each set of dimples extends laterally along a respective line across the tube (24) such that the line associated with a downwardly projecting set of dimples is parallel to the line associated with opposing upwardly projecting set of dimples. Accordingly, each set of downwardly projecting dimples extends in the same direction as the corresponding opposing upwardly projecting dimples.

The size, shape and arrangement of the dimples promote turbulent flow of the coolant through the tube. Kiser states that the purpose of the dimples is to enhance heat transfer from the coolant in the tube by causing "a turbulent fluid flow within the tube." (See, e.g., column 4, lines 57-58.) In particular, Kiser's dimples amplify the disturbances in the flow of coolant to ensure that the inertia forces in the flow are destabilizing so that the turbulent flow in Kiser's tube is self sustaining and never dies out.

Applicant's invention, as recited in amended claim 1, is directed to a motor vehicle radiator heat exchanger with one or more tubes having projections arranged in groups. Within each group, the projections are arranged along a line. In contrast to Kiser's dimples, each line of projections on one opposing wall of Applicant's tube extend in a different direction than the respective line of projections on the other

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opposing wall. Hence, each group of projections on one opposing wall extends along a line that is non-parallel to the line along which the opposing projections extend on the other wall. Further, the projections are spaced apart in a longitudinal direction such that the flow of radiator coolant is laminar before the radiator coolant encounters subsequent projections, since the viscous forces in the flow of commonly known radiator coolants restore laminar flow after the radiator coolant is diverted around the projections.

Thus, Kiser does not teach each and every limitation of amended claim 1. Accordingly, reconsideration and withdrawal of the rejection of claim 1 under 35 § 102(b) are respectfully requested.

Indeed, Kiser fails to appreciate the advantages of maintaining substantially laminar flow in the tube. Absent an appreciation of these advantages, there is no suggestion of a motor vehicle radiator heat exchanger tube with a group of projections on one opposing wall extending along a line in a different direction than the line of projections on the other opposing wall, as required by amended claim 1.

Thus, Kiser cannot render Applicant's invention, as claimed in amended claim 1, obvious. Accordingly, reconsideration and withdrawal of the rejection of claim 1 under 35 § 103(a) are respectfully requested.

Since Rhodes does not cure the deficiencies of Kiser and claims 2-12 depend from claim 1, the reasons for allowance of claim 1 apply as well to the dependent claims.

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Conclusion

In view of the preceding amendments and remarks, it is respectfully submitted that all of the pending claims (claims 1-12) are in condition for allowance. Such action is respectfully requested.

Respectfully submitted,

Dated: January 28, 2005


John M. Card (Reg. No. 48,423)
Attorney/Agent for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200